

Annual Report of Site Surveillance and Maintenance Activities at the Rocky Flats, Colorado, Site Calendar Year 2008

April 2009



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**U.S. Department of Energy
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Contents

Abbreviations	xv
Executive Summary	xix
1.0 Introduction	1-1
1.1 Purpose and Scope	1-2
1.2 Background	1-3
1.3 RFLMA Contact Records	1-4
2.0 Site Operations and Maintenance	2-1
2.1 Annual Site Inspection	2-1
2.2 Colorado Water Quality Control Commission (WQCC) Proceedings Related to Rocky Flats	2-2
2.2.1 Uranium (U), Gross Alpha and Gross Beta Standards	2-2
2.2.2 Temporary Modifications (TMs)	2-3
2.2.3 Regulation 38 Triennial Review	2-3
2.3 Pond Operations	2-4
2.4 Landfills	2-7
2.4.1 Present Landfill	2-7
2.4.1.1 Inspection Results	2-7
2.4.1.2 Slumps	2-8
2.4.1.3 Settlement Monuments	2-8
2.4.2 Original Landfill	2-8
2.4.2.1 Inspection Results	2-8
2.4.2.2 Settlement Monuments	2-8
2.4.2.3 Geotechnical Investigation and Repairs	2-9
2.5 Groundwater Plume Treatment Systems Maintenance	2-11
2.5.1 Mound Site Plume Treatment System	2-11
2.5.2 East Trenches Plume Treatment System	2-11
2.5.3 Solar Ponds Plume Treatment System	2-12
2.6 Erosion Control and Revegetation	2-12
2.6.1 Erosion Control	2-12
2.7 General Site Maintenance and Operations	2-13
2.7.1 Road Upgrades	2-13
2.7.2 Site Security	2-13
2.7.2.1 Security Issues	2-13
3.0 Environmental Monitoring	3-1
3.1 Water Monitoring	3-1
3.1.1 Introduction	3-1
3.1.1.1 Water Monitoring Highlights: CY 2008	3-1
3.1.1.2 Well Abandonment and Replacement	3-2
3.1.1.3 Use of Analytical Data	3-4
3.1.2 Routine Monitoring	3-8
3.1.2.1 POC Monitoring	3-8
3.1.2.2 POE Monitoring	3-15
3.1.2.3 AOC Wells and SW018	3-35
3.1.2.4 Boundary Wells	3-38
3.1.2.5 Sentinel Wells	3-39
3.1.2.6 Evaluation Wells	3-42

3.1.2.7	Investigative Monitoring.....	3-44
3.1.2.8	PLF Monitoring	3-46
3.1.2.9	OLF Monitoring.....	3-51
3.1.2.10	Groundwater Treatment System Monitoring.....	3-56
3.1.2.11	Pre-Discharge Monitoring	3-62
3.1.3	Rocky Flats Hydrology	3-63
3.1.3.1	General Hydrologic Setting	3-63
3.1.3.2	Surface-Water Hydrologic Data Presentation.....	3-68
3.1.3.3	Surface-Water Discharge Data Summaries	3-70
3.1.3.4	Precipitation Data.....	3-124
3.1.3.5	Groundwater Flow	3-128
3.1.4	Surface-Water Data Interpretation and Evaluation.....	3-138
3.1.4.1	Surface Water-Quality Summaries	3-138
3.1.4.2	Surface-Water Loading Analysis.....	3-159
3.1.5	Groundwater Data Interpretation and Evaluation.....	3-213
3.1.5.1	RFLMA Groundwater Monitoring Activities of 2008.....	3-213
3.1.5.2	Non-RFLMA Groundwater Monitoring Activities of 2008	3-218
3.1.5.3	Groundwater at the Rocky Flats Site: Discussion and Interpretations	3-220
3.1.5.4	Other Water-Related Issues in 2008	3-279
3.2	Air Monitoring.....	3-284
3.2.1	Introduction.....	3-284
3.3	Ecological Monitoring	3-285
3.3.1	Introduction.....	3-285
3.3.2	Vegetation Monitoring.....	3-285
3.3.2.1	Site Flora.....	3-286
3.3.2.2	Weed Mapping and Weed Control	3-286
3.3.2.3	Revegetation Activities in 2008.....	3-295
3.3.2.4	Revegetation Monitoring	3-295
3.3.2.5	PLF and OLF Monitoring	3-307
3.3.2.6	Photomonitoring Results.....	3-309
3.3.3	Wildlife Monitoring.....	3-309
3.3.3.1	Prairie Dog Surveys	3-309
3.3.4	Summary	3-310
3.4	RFLMA Ecological Sampling	3-310
3.5	Data Management	3-313
3.5.1	Water Data	3-313
3.5.2	Ecology Data.....	3-313
3.6	Validation and Data Quality Assessment	3-314
3.6.1	General Discussion	3-314
3.6.2	PARCC Parameters.....	3-316
3.6.2.1	Criteria for Precision.....	3-316
3.6.2.2	Criteria for Accuracy	3-317
3.6.2.3	Criteria for Representativeness	3-317
3.6.2.4	Criteria for Completeness	3-318
3.6.2.5	Criteria for Comparability.....	3-319
3.6.3	Water DQA Results for CY 2008	3-319
3.6.3.1	Precision During CY 2008.....	3-319

3.6.3.2	Accuracy During CY 2008	3-320
3.6.3.3	Representativeness During CY 2008	3-321
3.6.3.4	Completeness During CY 2008	3-322
3.6.3.5	Comparability During CY 2008.....	3-323
4.0	References	4-1

Figures

Figure 2-1.	Completed Notch at Dam B-2.....	2-5
Figure 2-2.	Completed Stoplog Structure at Dam A-2	2-6
Figure 3-1.	Rocky Flats Site Water Monitoring Locations and Precipitation Gages: Fourth Quarter CY 2008	3-5
Figure 3-2.	POC Monitoring Locations.....	3-9
Figure 3-3.	Volume-Weighted 30-Day Average Pu and Am Activities at GS01: Calendar Year Ending Fourth Quarter CY 2008	3-11
Figure 3-4.	Volume-Weighted 30-Day Average Total U Activities at GS01: Calendar Year Ending Fourth Quarter CY 2008	3-11
Figure 3-5.	POE Monitoring Locations	3-16
Figure 3-6.	Volume-Weighted Average Pu and Am Compliance Values at GS10: Calendar Year Ending Fourth Quarter CY 2008	3-18
Figure 3-7.	Volume-Weighted Average Total U Compliance Values at GS10: Calendar Year Ending Fourth Quarter CY 2008	3-18
Figure 3-8.	Volume-Weighted Average Metals Compliance Values at GS10: Calendar Year Ending Fourth Quarter CY 2008	3-20
Figure 3-9.	POE Monitoring Station GS10: Compliance Values and Individual Sample Results for Total U (January 1, 2008–February 1, 2009).....	3-23
Figure 3-10.	POE Monitoring Station GS10: Hydrograph and Individual Sample Results for Total U (January 1, 1997–February 22, 2009).....	3-24
Figure 3-11.	Average Annual Total U Concentrations at GS10: 1997–2009	3-27
Figure 3-12.	Annual Total U Loads at GS10: 1997–2009	3-28
Figure 3-13.	Variation of Total U Concentration with Flow Rate at GS10: 1997–2008 and Portion of 2009	3-29
Figure 3-14.	POE Monitoring Station GS10: Hydrograph and Individual Sample Results for Hardness (January 1, 1997–February 22, 2009)	3-30
Figure 3-15.	Volume-Weighted Average Pu and Am Compliance Values at SW093: Calendar Year Ending Fourth Quarter CY 2008	3-33
Figure 3-16.	Volume-Weighted Average Total U Compliance Values at SW093: Calendar Year Ending Fourth Quarter CY 2008	3-34
Figure 3-17.	Volume-Weighted Average Metals Compliance Values at SW093: Calendar Year Ending Fourth Quarter CY 2008	3-35
Figure 3-18.	AOC Well and SW018 Locations.....	3-37
Figure 3-19.	Boundary Well Locations	3-38
Figure 3-20.	Sentinel Well Locations.....	3-41
Figure 3-21.	Evaluation Well Locations.....	3-44
Figure 3-22.	Investigative Monitoring Locations.....	3-45
Figure 3-23.	PLF Monitoring Locations.....	3-47

Figure 3–24.	B, Se, U, and Zn in Downgradient Groundwater from PLF RCRA Wells Identified in 2008 ANOVA Data Evaluations.....	3–50
Figure 3–25.	OLF Monitoring Locations	3–51
Figure 3–26.	B and U in Downgradient Groundwater from OLF RCRA Wells Identified in 2008 ANOVA Data Evaluations	3–55
Figure 3–27.	RFLMA MSPTS Monitoring Locations	3–57
Figure 3–28.	RFLMA ETPTS Monitoring Locations	3–58
Figure 3–29.	RFLMA SPPTS Monitoring Locations	3–59
Figure 3–30.	PLFTS Monitoring Locations	3–61
Figure 3–31.	Pre-Discharge Sampling Locations.....	3–62
Figure 3–32.	Major Site Drainage Areas - Walnut Creek, Woman Creek, and Rock Creek: End of CY 2008.....	3–65
Figure 3–33.	Rocky Flats Site Water Routing Schematic: End of CY 2008	3–66
Figure 3–34.	Annual Discharge Summary from Major Site Drainages: CY 1997–2008.....	3–71
Figure 3–35.	Relative Total Discharge Summary from Major Site Drainages: Pre- and Post-Closure Periods	3–71
Figure 3–36.	Map Showing Relative CY 1997–2008 Discharge Volumes for POEs and POCs: Pre- and Post-Closure Periods	3–72
Figure 3–37.	Pond Inflows: CY 1997–2008	3–73
Figure 3–38.	Pond Outflows: CY 1997–2008	3–73
Figure 3–39.	Relative Total Inflow Volumes for Site Ponds: Pre- and Post-Closure Periods.....	3–74
Figure 3–40.	Relative Total Outflow Volumes for Site Ponds: Pre- and Post-Closure Periods.....	3–75
Figure 3–41.	GS01 Drainage Area.....	3–76
Figure 3–42.	CY 2008 Mean Daily Hydrograph at GS01: Woman Creek at Indiana Street	3–77
Figure 3–43.	CY 1997–2008 Mean Daily Hydrograph at GS01: Woman Creek at Indiana Street	3–78
Figure 3–44.	GS03 Drainage Area.....	3–79
Figure 3–45.	CY 2008 Mean Daily Hydrograph at GS03: Walnut Creek at Indiana Street	3–80
Figure 3–46.	CY 1997–2008 Mean Daily Hydrograph at GS03: Walnut Creek at Indiana Street	3–81
Figure 3–47.	GS05 Drainage Area.....	3–82
Figure 3–48.	CY 2008 Mean Daily Hydrograph at GS05: North Woman Creek at West Fenceline.....	3–83
Figure 3–49.	CY 1997–2008 Mean Daily Hydrograph at GS05: North Woman Creek at West Fenceline.....	3–84
Figure 3–50.	GS08 Drainage Area.....	3–85
Figure 3–51.	CY 2008 Mean Daily Hydrograph at GS08: South Walnut Creek at Pond B-5 Outlet	3–86
Figure 3–52.	CY 1997–2008 Mean Daily Hydrograph at GS08: South Walnut Creek at Pond B-5 Outlet	3–87
Figure 3–53.	GS10 Drainage Area.....	3–88
Figure 3–54.	CY 2008 Mean Daily Hydrograph at GS10: South Walnut Creek at Pond B-1 Bypass.....	3–89

Figure 3–55.	CY 1997–2008 Mean Daily Hydrograph at GS10: South Walnut Creek at Pond B-1 Bypass	3–90
Figure 3–56.	GS11 Drainage Area	3–91
Figure 3–57.	CY 2008 Mean Daily Hydrograph at GS11: North Walnut Creek at Pond A-4 Outlet	3–92
Figure 3–58.	CY 1997–2008 Mean Daily Hydrograph at GS11: North Walnut Creek at Pond A-4 Outlet	3–93
Figure 3–59.	GS12 Drainage Area	3–94
Figure 3–60.	CY 2008 Mean Daily Hydrograph at GS12: North Walnut Creek at Pond A-3 Outlet	3–95
Figure 3–61.	CY 1997–2008 Mean Daily Hydrograph at GS12: North Walnut Creek at Pond A-3 Outlet	3–96
Figure 3–62.	GS13 Drainage Area	3–97
Figure 3–63.	CY 2008 Mean Daily Hydrograph at GS13: North Walnut Creek at Pond A-1 Bypass.....	3–98
Figure 3–64.	CY 2005–2008 Mean Daily Hydrograph at GS13: North Walnut Creek at Pond A-1 Bypass.....	3–99
Figure 3–65.	GS31 Drainage Area	3–100
Figure 3–66.	CY 2008 Mean Daily Hydrograph at GS31: Woman Creek at Pond C-2 Outlet.....	3–101
Figure 3–67.	CY 1997–2008 Mean Daily Hydrograph at GS31: Woman Creek at Pond C-2 Outlet	3–102
Figure 3–68.	GS33 Drainage Area	3–103
Figure 3–69.	CY 2008 Mean Daily Hydrograph at GS33: No Name Gulch at Walnut Creek	3–104
Figure 3–70.	CY 1997–2008 Mean Daily Hydrograph at GS33: No Name Gulch at Walnut Creek	3–105
Figure 3–71.	GS51 Drainage Area	3–106
Figure 3–72.	CY 2008 Mean Daily Hydrograph at GS51: Ditch South of 903 Pad.....	3–107
Figure 3–73.	CY 2001–2008 Mean Daily Hydrograph at GS51: Ditch South of 903 Pad.....	3–108
Figure 3–74.	GS59 Drainage Area	3–109
Figure 3–75.	CY 2008 Mean Daily Hydrograph at GS59: Woman Creek Upstream of Antelope Springs Confluence	3–110
Figure 3–76.	CY 2002–2008 Mean Daily Hydrograph at GS59: Woman Creek Upstream of Antelope Springs Confluence	3–111
Figure 3–77.	SPPDISCHARGE GALLERY Location	3–112
Figure 3–78.	CY 2008 Mean Daily Hydrograph at SPPDISCHARGE GALLERY.....	3–113
Figure 3–79.	CY 2007–2008 Mean Daily Hydrograph at SPPDISCHARGE GALLERY	3–114
Figure 3–80.	SW018 Drainage Area	3–115
Figure 3–81.	CY 2008 Mean Daily Hydrograph at SW018: FC-2 at FC-2 Wetland.....	3–116
Figure 3–82.	CY 2003–2008 Mean Daily Hydrograph at SW018: FC-2 at FC-2 Wetland	3–117
Figure 3–83.	SW027 Drainage Area	3–118
Figure 3–84.	CY 2008 Mean Daily Hydrograph at SW027: SID at Pond C-2	3–119
Figure 3–85.	CY 1997–2008 Mean Daily Hydrograph at SW027: SID at Pond C-2.....	3–120
Figure 3–86.	SW093 Drainage Area	3–121

Figure 3–87.	CY 2008 Mean Daily Hydrograph at SW093: North Walnut Creek Upstream of Pond A-1 Bypass.....	3–122
Figure 3–88.	CY 1997–2008 Mean Daily Hydrograph at SW093: North Walnut Creek Upstream of Pond A-1 Bypass	3–123
Figure 3–89.	Site Precipitation Gages: CY 2008	3–124
Figure 3–90.	Annual Total Precipitation for CY 1997–2008.....	3–125
Figure 3–91.	Average Monthly Precipitation for CY 1997–2008.....	3–125
Figure 3–92.	Relative Monthly Precipitation Totals for CY 1997–2008.....	3–126
Figure 3–93.	Monthly Precipitation for CY 2008	3–126
Figure 3–94.	Relative Monthly Precipitation Volumes for CY 2008	3–127
Figure 3–95.	Daily Precipitation Totals for CY 2008	3–127
Figure 3–96.	UHSU Potentiometric Contours: Second Quarter CY 2008.....	3–131
Figure 3–97.	UHSU Potentiometric Contours: Fourth Quarter CY 2008.....	3–132
Figure 3–98.	Median Pu-239,240 Activities for CY 1997–October 13, 2005	3–142
Figure 3–99.	Post-Closure Median Pu-239,240 Activities.....	3–143
Figure 3–100.	Median Am-241 Activities for CY 1997–October 13, 2005	3–145
Figure 3–101.	Post-Closure Median Am-241 Activities.....	3–146
Figure 3–102.	Median Total U Activities for CY 1997–October 13, 2005	3–148
Figure 3–103.	Post-Closure Median Total U Activities.....	3–149
Figure 3–104.	Post-Closure Median Nitrate+Nitrite as Nitrogen Concentrations	3–151
Figure 3–105.	Average Pu/Am Ratios for CY 1997–October 13, 2005	3–153
Figure 3–106.	Post-Closure Average Pu/Am Ratios.....	3–154
Figure 3–107.	Average U-233,234/U-238 Ratios for CY 1997–October 13, 2005	3–156
Figure 3–108.	Post-Closure Average U-233,234/U-238 Ratios.....	3–157
Figure 3–109.	Relative Average Annual Pu Loading Schematic: CY 1997–2005.....	3–161
Figure 3–110.	Relative Average Annual Pu Loading Schematic: CY 2006–2008.....	3–162
Figure 3–111.	Relative Average Annual Am Loading Schematic: CY 1997–2005	3–163
Figure 3–112.	Relative Average Annual Am Loading Schematic: CY 2006–2008.....	3–164
Figure 3–113.	Relative Average Annual Total U Loading Schematic: CY 2003–2005.....	3–165
Figure 3–114.	Relative Average Annual Total U Loading Schematic: CY 2006–2008.....	3–166
Figure 3–115.	Combined Annual Pu and Am Loads from Walnut and Woman Creeks: CY 1997–2008.....	3–168
Figure 3–116.	Annual Pu Loads from Walnut and Woman Creeks: CY 1997–2008	3–168
Figure 3–117.	Relative Average Annual Pu Load Totals from Walnut and Woman Creeks	3–169
Figure 3–118.	Annual Am Loads from Walnut and Woman Creeks: CY 1997–2008	3–169
Figure 3–119.	Relative Average Annual Am Load Totals from Walnut and Woman Creeks	3–170
Figure 3–120.	Annual Total U Loads from Walnut and Woman Creeks: CY 2003– 2008.....	3–171
Figure 3–121.	Relative Average Annual Total U Load Totals from Walnut and Woman Creeks.....	3–171
Figure 3–122.	Annual Pu and Am Loads at GS03: CY 1997–2008	3–174
Figure 3–123.	Annual Pu Loads at GS03, GS08, and GS11: CY 1997–2008	3–174
Figure 3–124.	Relative Average Annual Pu Load Totals at GS03, GS08, and GS11	3–175
Figure 3–125.	Annual Am Loads at GS03, GS08, and GS11: CY 1997–2008	3–176
Figure 3–126.	Relative Average Annual Am Load Totals at GS03, GS08, and GS11.....	3–177
Figure 3–127.	Annual Total U Loads at GS03, GS08, and GS11: CY 2003–2008.....	3–178

Figure 3–128. Relative Average Annual Total U Load Totals at GS03, GS08, and GS11	3–179
Figure 3–129. Annual Pu and Am Loads at GS01: CY 1997–2008	3–181
Figure 3–130. Annual Pu Loads at GS01 and GS31: CY 1997–2008	3–182
Figure 3–131. Relative Average Annual Pu Load Totals at GS01 and GS31: CY 1997–2005	3–182
Figure 3–132. Annual Am Loads at GS01 and GS31: CY 1997–2008	3–183
Figure 3–133. Relative Average Annual Am Load Totals at GS01 and GS31: CY 1997–2005	3–183
Figure 3–134. Annual Total U Loads at GS01 and GS31: CY 2003–2008	3–184
Figure 3–135. Relative Average Annual Total U Load Totals at GS01 and GS31: CY 2003–2005	3–185
Figure 3–136. Annual Pu Loads from Terminal Ponds A-4, B-5, and C-2: CY 1997–2008	3–186
Figure 3–137. Relative Average Annual Pu Load Totals from Terminal Ponds A-4, B-5, and C-2	3–187
Figure 3–138. Annual Am Loads from Terminal Ponds A-4, B-5, and C-2: CY 1997–2008	3–187
Figure 3–139. Relative Average Annual Am Load Totals from Terminal Ponds A-4, B-5, and C-2	3–188
Figure 3–140. Annual Total U Loads from Terminal Ponds A-4, B-5, and C-2: CY 1997–2008	3–189
Figure 3–141. Relative Average Annual Total U Load Totals from Terminal Ponds A-4, B-5, and C-2	3–189
Figure 3–142. Annual Pu Loads for the A- and B-Series Ponds: CY 1997–2008	3–191
Figure 3–143. Relative Average Annual Pu Load Totals for the A- and B-Series Ponds	3–192
Figure 3–144. Annual Am Loads for the A- and B-Series Ponds: CY 1997–2008	3–193
Figure 3–145. Relative Average Annual Am Load Totals for the A- and B-Series Ponds	3–194
Figure 3–146. Relative Average Annual Total U Loading Schematic for the A- and B-Series Ponds: CY 1997–2005	3–195
Figure 3–147. Relative Average Annual Total U Loading Schematic for the A- and B-Series Ponds: CY 2006–2008	3–196
Figure 3–148. Annual Total U Loads for the A- and B-Series Ponds: CY 1997–2008	3–197
Figure 3–149. Relative Average Annual Total U Load Totals for the A- and B-Series Ponds	3–198
Figure 3–150. Annual Pu Loads for Pond C-2: CY 1997–2008	3–199
Figure 3–151. Relative Average Annual Pu Load Totals for Pond C-2	3–200
Figure 3–152. Annual Am Loads for Pond C-2: CY 1997–2008	3–201
Figure 3–153. Relative Average Annual Am Load Totals for Pond C-2	3–201
Figure 3–154. Relative Average Annual U Loading Schematic for Pond C-2: CY 1997–2005	3–203
Figure 3–155. Relative Average Annual U Loading Schematic for Pond C-2: CY 2006–2008	3–204
Figure 3–156. Annual Total U Loads for Pond C-2: CY 1997–2008	3–205
Figure 3–157. Relative Average Annual Total U Load Totals for Pond C-2	3–205
Figure 3–158. Combined Annual Pu Loads from Major COU Drainages and Former WWTP: CY 1997–2008	3–207

Figure 3–159. Relative Average Annual Pu Load Totals from Major COU Drainages and Former WWTP.....	3–208
Figure 3–160. Annual Am Loads from Major COU Drainages and WWTP: CY 1997–2008.....	3–209
Figure 3–161. Relative Average Annual Am Load Totals from Major COU Drainages and WWTP.....	3–209
Figure 3–162. Annual Pu and Am Loads at GS10: CY 1997–2008	3–210
Figure 3–163. Annual Pu and Am Loads at the WWTP: CY 1997–2008	3–210
Figure 3–164. Annual Pu and Am Loads at SW027: CY 1997–2008	3–211
Figure 3–165. Annual Pu and Am Loads at SW093: CY 1997–2008	3–211
Figure 3–166. Annual Total U Loads from Major COU Drainages and Former WWTP: CY 1997–2008.....	3–212
Figure 3–167. Relative Average Annual Total U Loads from Major COU Drainages and Former WWTP	3–213
Figure 3–168. Time-Series Plot of Discontinuous U Concentrations from Select Wells	3–225
Figure 3–169. VOC Concentrations in Samples from Mound Plume and OBP#2 Plume Source Area Evaluation Wells 00897 and 91105	3–227
Figure 3–170. Concentrations of VOCs in OBP#2 Source Area Evaluation Well 91105.....	3–228
Figure 3–171. VOC Concentrations in Samples from Mound Plume and OBP#2 Plume Downgradient Wells 15699 and 91203	3–229
Figure 3–172. Selected VOC Concentrations in Samples from Well 91305	3–230
Figure 3–173. Hydrograph for MSPTS Since 2000	3–232
Figure 3–174. Hydrograph for MSPTS for CY 2008.....	3–232
Figure 3–175. Recent Concentrations of Select VOCs in MSPTS Influent and Effluent.....	3–235
Figure 3–176. Concentrations of Selected VOCs in East Trenches Plume Source-Area Evaluation Wells 3687 and 05691	3–237
Figure 3–177. Most Commonly Detected VOCs in Sentinel Wells Downgradient of the ETPTS.....	3–238
Figure 3–178. Hydrograph for ETPTS Since 2000.....	3–240
Figure 3–179. Hydrograph for ETPTS for CY 2008.....	3–240
Figure 3–180. Nitrate Concentrations in Evaluation Wells Along the Former SEP Margins	3–243
Figure 3–181. U Concentrations in Evaluation Wells Along the Former SEP Margins.....	3–244
Figure 3–182. U and Nitrate Concentrations in Wells Downgradient of the Former SEPs	3–245
Figure 3–183. Primary VOCs in the SEP-Area VOC Plume	3–246
Figure 3–184. Hydrograph for SPPTS Since 2000	3–248
Figure 3–185. Hydrograph for SPPTS for CY 2008.....	3–248
Figure 3–186. Recent Concentrations of Nitrate in Samples from SPPTS Monitoring Locations.....	3–250
Figure 3–187. Recent Concentrations of U in Samples from SPPTS Monitoring Locations.....	3–251
Figure 3–188. Schematic of How SPPTS Phase I Upgrades Affect the System.....	3–254
Figure 3–189. Plan View Drawing of SPPTS Phase I Upgrades	3–255
Figure 3–190. Summary of Non-RFLMA Field-Evaluation Nitrate Concentration Data from SPPTS Locations Preceding and Following Phase I Upgrades	3–260

Figure 3–191. Concentrations of VOCs in Source-Area Wells 00191 (903 Pad) and 07391 (Ryan’s Pit)	3–262
Figure 3–192. Concentrations of VOCs Within 903 Pad/Ryan’s Pit Plume.....	3–263
Figure 3–193. VOCs in Downgradient 903 Pad/Ryan’s Pit Plume Well 90399.....	3–264
Figure 3–194. Concentrations of Primary VOCs in Former B444/South IA Plume Area Evaluation Wells	3–265
Figure 3–195. Concentrations of Primary VOCs in Central IA Evaluation Wells	3–267
Figure 3–196. Concentrations of Primary VOCs in North-Central IA Evaluation Wells.....	3–268
Figure 3–197. VOCs Present in the VC Plume Source Area	3–270
Figure 3–198. Constituents with Statistically Significant Trends in Samples from Sentinel Well 33703.....	3–271
Figure 3–199. Concentrations of Primary VOCs in IHSS 118.1 Source Area and Plume	3–272
Figure 3–200. Concentrations of Primary VOCs in PU&D Yard Plume Source Area Well 30900.....	3–274
Figure 3–201. Concentrations of Primary VOCs in OU 1 Source Area Well 891WEL.....	3–276
Figure 3–202. Concentrations of U in Boundary Wells	3–277
Figure 3–203. Concentrations of Primary VOCs and U in B991 Sentinel Wells	3–278
Figure 3–204. Concentrations of U in B881 Sentinel Wells.....	3–279
Figure 3–205. S-K Trend Plot for Nitrate+nitrite as Nitrogen in Samples from AOC Well B206989	3–280
Figure 3–206. Concentrations of Nitrate and U in Groundwater Samples from AOC Well B206989	3–281
Figure 3–207. Concentrations of VOCs in Sentinel Well Monitoring Hillside South of Former B991	3–282
Figure 3–208. 2008 Diffuse Knapweed (<i>Centaurea diffusa</i>) Distribution at Rocky Flats	3–287
Figure 3–209. 2008 Dalmation Toadflax (<i>Linaria dalmatica</i>) Distribution at Rocky Flats.....	3–288
Figure 3–210. 2008 Miscellaneous Noxious Weed Locations at Rocky Flats.....	3–291
Figure 3–211. 2008 Herbicide Application Locations at the Rocky Flats Site.....	3–292
Figure 3–212. 2008 Interseeding/Revegetation Locations at the Rocky Flats Site.....	3–297
Figure 3–213. 2008 Fertilizer Locations at Rocky Flats	3–298
Figure 3–214. 2008 Revegetation Monitoring Units at Rocky Flats	3–303
Figure 3–215. 2008 Black-tailed Prairie Dog Locations at Rocky Flats.....	3–311

Tables

Table 1–1. Status of RFLMA Contact Records	1–5
Table 2–1. CY 2008 Pond Water Discharges and Transfers	2–6
Table 3–1. Wells Abandoned in 2008.....	3–3
Table 3–2. Summary of Original Well 45605 and Replacement Well 45608	3–4
Table 3–3. U Isotope Conversion Factors Used in Groundwater Evaluations	3–7
Table 3–4. Sampling and Data Evaluation Protocols at POCs	3–9
Table 3–5. Annual Volume-Weighted Average Radionuclide Activities at GS01 for 1997–2008.....	3–10

Table 3-6.	Annual Volume-Weighted Average Radionuclide Activities and Nitrate+Nitrite as Nitrogen Concentrations at GS03 for 1997–2008	3–12
Table 3-7.	Annual Volume-Weighted Average Radionuclide Activities and Nitrate+Nitrite as Nitrogen Concentrations at GS08 for 1997–2008	3–13
Table 3-8.	Annual Volume-Weighted Average Radionuclide Activities and Nitrate+Nitrite as Nitrogen Concentrations at GS11 for 1997–2008	3–14
Table 3-9.	Annual Volume-Weighted Average Radionuclide Activities at GS31 for 1997–2008.....	3–15
Table 3-10.	Sampling and Data Evaluation Protocols at POEs	3–15
Table 3-11.	Annual Volume-Weighted Average Radionuclide Activities at GS10 for 1997–2008.....	3–17
Table 3-12.	Annual Volume-Weighted Average Hardness and Metals Concentrations at GS10 for 1997–2008	3–19
Table 3-13.	Reportable 12-Month Rolling Average Values for POE Monitoring Location GS10	3–21
Table 3-14.	Recent Analytical Results for Composite Samples Collected at GS10	3–21
Table 3-15.	U Concentrations and Isotopic Signatures from Samples Collected at GS10 as Reported by LANL.....	3–26
Table 3-16.	CY 2007 Locations Selected for Sampling and High-Resolution U Analysis.....	3–26
Table 3-17.	CY 2008 Locations Selected for Sampling and High-Resolution U Analysis.....	3–26
Table 3-18.	Annual Volume-Weighted Average Radionuclide Activities at SW027 for 1997–2008.....	3–31
Table 3-19.	Annual Volume-Weighted Average Hardness and Metals Concentrations at SW027 for 1997–2008	3–32
Table 3-20.	Annual Volume-Weighted Average Radionuclide Activities at SW093 for 1997–2008.....	3–33
Table 3-21.	Annual Volume-Weighted Average Hardness and Metals Concentrations at SW093 for 1997–2008	3–34
Table 3-22.	Sampling and Data Evaluation Protocols at AOC Wells and SW018.....	3–36
Table 3-23.	Sampling and Data Evaluation Protocols at Boundary Wells	3–38
Table 3-24.	Sampling and Data Evaluation Protocols at Sentinel Wells	3–39
Table 3-25.	Sampling and Data Evaluation Protocols at Evaluation Wells.....	3–42
Table 3-26.	Sampling and Data Evaluation Protocols at Investigative Monitoring Locations.....	3–45
Table 3-27.	Sampling and Data Evaluation Protocols at PLF RCRA Monitoring Wells	3–47
Table 3-28.	RCRA Groundwater Sampling Performed in 2008 at the PLF.....	3–48
Table 3-29.	Results of Groundwater ANOVA Evaluation for 2008 at the PLF	3–49
Table 3-30.	Sampling and Data Evaluation Protocols at OLF Surface-Water Monitoring Locations.....	3–52
Table 3-31.	Sampling and Data Evaluation Protocols at OLF RCRA Monitoring Wells	3–52
Table 3-32.	Se Analytical Results for Composite Samples Collected at GS59 in CY 2008.....	3–53
Table 3-33.	RCRA Groundwater Sampling Performed in 2008 at the OLF	3–53
Table 3-34.	Results of Groundwater ANOVA Evaluation at the OLF	3–54

Table 3–35.	VOCs Detected in 2008 in Downgradient Wells at the OLF.....	3–55
Table 3–36.	RFLMA Sampling and Data Evaluation Protocols at MSPTS Monitoring Locations.....	3–57
Table 3–37.	RFLMA Sampling and Data Evaluation Protocols at ETPTS Monitoring Locations.....	3–58
Table 3–38.	RFLMA Sampling and Data Evaluation Protocols at SPPTS Monitoring Locations.....	3–59
Table 3–39.	Sampling and Data Evaluation Protocols at PLFTS Monitoring Locations.....	3–60
Table 3–40.	PLFTS Effluent (PLFSYSEFF): Summary of CY 2008 Grab Sampling Analytical Results Exceeding RFLMA Surface-Water Standards	3–61
Table 3–41.	Sampling and Data Evaluation Protocols at Pre-Discharge Monitoring Locations.....	3–62
Table 3–42.	Monitoring Network Precipitation Gage Information	3–124
Table 3–43.	List of Abandoned Wells with Hydrographs	3–133
Table 3–44.	Calculated Flow Velocities for 2008	3–136
Table 3–45.	Summary Statistics for Pu-239,240 Analytical Results in CY 1997–October 13, 2005.....	3–140
Table 3–46.	Post-Closure Summary Statistics for Pu-239,240 Analytical Results (October 13, 2005–December 31, 2008)	3–141
Table 3–47.	Summary Statistics for Am-241 Analytical Results in CY 1997–October 13, 2005.....	3–144
Table 3–48.	Post-Closure Summary Statistics for Am-241 Analytical Results (October 13, 2005–December 31, 2008)	3–144
Table 3–49.	Summary Statistics for Total U Analytical Results in CY 1997–October 13, 2005.....	3–147
Table 3–50.	Post-Closure Summary Statistics for Total U Analytical Results (October 13, 2005–December 31, 2008)	3–147
Table 3–51.	Post-Closure Summary Statistics for Nitrate+Nitrite as Nitrogen Analytical Results (October 13, 2005–December 31, 2008).....	3–150
Table 3–52.	Average Pu/Am Ratios for Analytical Results in CY 1997– October 13, 2005.....	3–152
Table 3–53.	Post-Closure Average Pu/Am Ratios for Analytical Results (October 13, 2005–December 31, 2008)	3–152
Table 3–54.	Average U-233,234/U-238 Ratios for Analytical Results in CY 1997–October 13, 2005.....	3–155
Table 3–55.	Post-Closure Average U-233,234/U-238 Ratios for Analytical Results (October 13, 2005–December 31, 2008)	3–155
Table 3–56.	Summary Statistics for POE Metals Results from GS10 in CY 1997–October 13, 2005.....	3–158
Table 3–57.	Post-Closure Summary Statistics for POE Metals Results from GS10 (October 13, 2005–December 31, 2008)	3–158
Table 3–58.	Summary Statistics for POE Metals Results from SW027 in CY 1997–October 13, 2005	3–158
Table 3–59.	Post-Closure Summary Statistics for POE Metals Results from SW027 (October 13, 2005–December 31, 2008)	3–159
Table 3–60.	Summary Statistics for POE Metals Results from SW093 in CY 1997–October 13, 2005.....	3–159

Table 3-61.	Post-Closure Summary Statistics for POE Metals Results from SW093 (October 13, 2005–December 31, 2008)	3-159
Table 3-62.	Activity to Mass Conversion Factors for Pu, Am, and U Isotopes	3-160
Table 3-63.	Off-Site Pu and Am Loads from Walnut and Woman Creeks: CY 1997–2008	3-167
Table 3-64.	Total U Loads from Walnut and Woman Creeks: CY 2003–2008	3-170
Table 3-65.	Pu Loads at GS03, GS08, and GS11: CY 1997–2008	3-173
Table 3-66.	Am Loads at GS03, GS08, and GS11: CY 1997–2008	3-173
Table 3-67.	Total U Loads at GS03, GS08, and GS11: CY 2003–2008	3-177
Table 3-68.	Pu Loads at GS01 and GS31: CY 1997–2008	3-180
Table 3-69.	Am Loads at GS01 and GS31: CY 1997–2008	3-181
Table 3-70.	Total U Loads at GS01 and GS31: CY 2003–2008	3-184
Table 3-71.	Pu and Am Loads from Terminal Ponds A-4, B-5, and C-2: CY 1997–2008	3-186
Table 3-72.	Total U Loads from Terminal Ponds A-4, B-5, and C-2: CY 1997–2008	3-188
Table 3-73.	Pu Load Summary for the A- and B-Series Ponds: CY 1997–2008	3-191
Table 3-74.	Am Load Summary for the A- and B-Series Ponds: CY 1997–2008	3-193
Table 3-75.	Total U Load Summary for the A- and B-Series Ponds: CY 1997–2008	3-197
Table 3-76.	Pu Load Summary for Terminal Pond C-2: CY 1997–2008	3-199
Table 3-77.	Am Load Summary for Terminal Pond C-2: CY 1997–2008	3-200
Table 3-78.	Total U Load Summary for Terminal Pond C-2: CY 1997–2008	3-202
Table 3-79.	COU Pu and Am Loads: CY 1997–2008	3-207
Table 3-80.	COU Total U Loads: CY 1997–2008	3-212
Table 3-81.	Changes to the Groundwater Monitoring Network in CY 2008	3-214
Table 3-82.	RFLMA Monitoring Classifications for the Groundwater Monitoring Network	3-214
Table 3-83.	Summary of Scheduled RFLMA-Required Groundwater Sampling in CY 2008 (by Quarter)	3-215
Table 3-84.	Summary of Groundwater Samples Not Successfully Collected in 2008	3-218
Table 3-85.	Summary of Non-RFLMA Groundwater Monitoring Performed in 2008	3-218
Table 3-86.	Summary of Statistical Trend Calculations	3-221
Table 3-87.	Estimated Volumes of Water Treated by the MSPTS	3-231
Table 3-88.	Select VOC Data (µg/L) from MSPTS Influent and Effluent	3-234
Table 3-89.	Summary of VOCs Detected in 2008 at GS10	3-235
Table 3-90.	Estimated Volumes of Water Treated by the ETPTS	3-239
Table 3-91.	Summary of Recent VOC Data from ETPTS Influent and Effluent	3-241
Table 3-92.	Estimated Volumes of Water Treated by the SPPTS	3-247
Table 3-93.	Summary of Nitrate and U Concentrations in Samples from the DG Prior to and Following Site Closure	3-252
Table 3-94.	Summary of Evaluation Sampling Performed in 2008 Following SPPTS Phase I Completion	3-257
Table 3-95.	Summary of Nitrate and U Concentrations in Samples from the DG Prior to and Following Site Closure, and Following Phase I SPPTS Upgrades	3-258
Table 3-96.	High-Resolution U Isotopic Characterization in 2008	3-283
Table 3-97.	COU Noxious Weed Acreage Summary	3-289
Table 3-98.	FY 2008 Herbicide Application Summary	3-293

Table 3–99.	FY 2008 Interseeding/Revegetation Locations Summary for the Rocky Flats Site.....	3–299
Table 3–100.	Fertilizer Application Locations FY 2008	3–300
Table 3–101.	Basal Cover Summary at Revegetation Locations 2008.....	3–305
Table 3–102.	CY 2008 Sample Type Breakdown	3–319
Table 3–103.	Summary of DER Values.....	3–320
Table 3–104.	Summary of RPD Values.....	3–320
Table 3–105.	Summary of MS and MSD Recovery Data.....	3–321
Table 3–106.	Summary of V&V Data Completeness.....	3–322
Table 3–107.	Summary of Field QC Samples and Data Records	3–323

Appendixes

Appendix A	Hydrologic Data
Appendix B	Water-Quality Data
Appendix C	Landfill Inspection Forms—Fourth Quarter CY 2008
Appendix D	Data Evaluation Flowcharts Reproduced from RFLMA and the RFSOG
Appendix E	LANL Reports: <i>Thermal Ionization Mass Spectrometry Uranium Results for September 2008 RFETS Waters</i> and <i>Thermal Ionization Mass Spectrometry Uranium Results for November 2008 RFETS Waters</i>
Appendix F	<i>SPPTS Phase III: Pilot-Scale Optimization of Nitrate Treatment</i>
Appendix G	RFLMA Contact Records

2008 Ecology Data for the Rocky Flats Site

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Abbreviations

Ag	silver
Am	americium
ANOVA	Analysis of Variance
AOC	Area of Concern
B	boron
Be	beryllium
BMP	best management practice
CAD/ROD	Corrective Action Decision/Record of Decision
Cd	cadmium
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act – “Superfund”
CFR	<i>Code of Federal Regulations</i>
cfs	cubic feet per second
cm/s	centimeters per second
CNHP	Colorado Natural Heritage Program
COU	Central Operable Unit
Cr	chromium
CY	calendar year
D&D	decontamination and decommissioning
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
DER	duplicate error ratio
DG	Discharge Gallery
DOE	U.S. Department of Energy
DQA	data quality assessment
EPA	U.S. Environmental Protection Agency
ERP	<i>Emergency Response Plan for Rocky Flats Site Dams</i>
ESL	Environmental Sciences Laboratory
ETPTS	East Trenches Plume Treatment System
FC	Functional Channel
FR	<i>Federal Register</i>
ft/yr	feet per year
g	gram
GIS	Geographic Information System
gpm	gallons per minute
GWIS	Groundwater Intercept System
HR ICP/MS	high-resolution inductively coupled plasma/mass spectrometry
HRC	Hydrogen Release Compound [®]
HRT	hydraulic residence time
IA	Industrial Area
IC	institutional control
IHSS	Individual Hazardous Substance Site
IMP	Integrated Monitoring Plan
ITPH	Interceptor Trench Pump House

ITS	Interceptor Trench System
K-H	Kaiser-Hill Company, LLC
L	liter
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LM	Office of Legacy Management
M&M	monitoring and maintenance
m ³	cubic meter
MCL	maximum contaminant level
MDA	minimum detectable activity
M-K	Mann-Kendall
µg	microgram
µg/L	micrograms per liter
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MSPTS	Mound Site Plume Treatment System
NA	not applicable
NOID	Notice of Intent to Delete
NPL	National Priorities List
NWTC	National Wind Technology Center
OBP	Oil Burn Pit
OLF	Original Landfill
OU	Operable Unit
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCE	tetrachloroethene
pCi	picocurie
pCi/L	picocuries per liter
pCi/µg	picocuries per microgram
PIP	Public Involvement Plan
PLF	Present Landfill
PLFTS	Present Landfill Treatment System
POC	Point of Compliance
POE	Point of Evaluation
POU	Peripheral Operable Unit
PQL	practical quantitation limit
Pu	plutonium
PU&D	Property Utilization and Disposal
PVC	polyvinyl chloride
PZ	piezometer
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFCA	<i>Rocky Flats Cleanup Agreement</i>
RFETS	Rocky Flats Environmental Technology Site
RFLMA	<i>Rocky Flats Legacy Management Agreement</i>
RFSOG	<i>Rocky Flats Site Operations Guide</i>
RI/FS	Remedial Investigation/Feasibility Study

RMRS	Rocky Mountain Remediation Services
RPD	relative percent difference
Se	selenium
SED	Sitewide Ecological Database
SEEP _{ro}	Site Environmental Evaluation for Projects
SEP	Solar Evaporation Pond
SID	South Interceptor Ditch
S-K	Seasonal-Kendall
SPP	Solar Ponds Plume
SPPTS	Solar Ponds Plume Treatment System
SVOC	semivolatile organic compound
TCA	trichloroethane
TCB	trichlorobenzene
TCE	trichloroethene
TIMS	thermal ionization mass spectrometry
TM	temporary modification
TSS	total suspended solids
U	uranium
UHSU	upper hydrostratigraphic unit
USFWS	U.S. Fish and Wildlife Services
V&V	validation and verification
VC	vinyl chloride
VOC	volatile organic compound
WQCA	Water Quality Control Act
WQCC	Water Quality Control Commission
WQP	water-quality parameter
WWTP	Waste Water Treatment Plant
yr	year
ZVI	zero-valent iron

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Executive Summary

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) is responsible for implementing the final response action selected in the *Final Corrective Action Decision/Record of Decision for Rocky Flats Plant (USDOE) Peripheral Operable Unit and Central Operable Unit* (CAD/ROD) issued September 29, 2006, for the Rocky Flats Site (Site).

Under the CAD/ROD, two Operable Units (OUs) were established within the boundaries of the Rocky Flats property: the Peripheral OU (POU) and the Central OU (COU). The COU consolidates all areas of the Site that require additional remedial or corrective actions, while also considering practicalities of future land management. The POU includes the remaining, generally unimpacted portions of the Site and surrounds the COU. The response action in the Final CAD/ROD is no action for the POU, and institutional and physical controls with continued monitoring for the COU. The CAD/ROD determined that conditions in the POU were suitable for unrestricted use. The U.S. Environmental Protection Agency (EPA) subsequently published a Notice of Partial Deletion from the National Priorities List for the POU on May 25, 2007.

DOE, EPA, and the Colorado Department of Public Health and Environment (CDPHE) have chosen to implement the monitoring and maintenance requirements of the CAD/ROD under, and as described in, the *Rocky Flats Legacy Management Agreement* (RFLMA), executed March 14, 2007. RFLMA Attachment 2 defines the COU remedy surveillance and maintenance requirements. The requirements include environmental monitoring; maintenance of the erosion controls, access controls (signs), landfill covers, and groundwater treatment systems; and operation of the groundwater treatment systems.

The *Rocky Flats Site Operations Guide* was prepared by LM to serve as the primary internal document to guide work to satisfy the requirements of RFLMA and implement best management practices at the Site.

This report addresses all surveillance and maintenance activities conducted at the Site during Calendar Year 2008 (January 1 through December 31, 2008). Highlights of the surveillance and maintenance activities are as follows:

- RFLMA references the use of contact records to document CDPHE approvals of field modifications to implement approved response actions. RFLMA Attachment 2 references the use of contact records to document the outcome of consultation related to addressing any reportable conditions. This report discusses RFLMA contact records issued in 2008 and their status as of December 31, 2008.
- Several Colorado Water Quality Control Commission (WQCC) proceedings related to surface water standards for stream segments at Rocky Flats occurred in 2008. WQCC accepted DOE's petition for a rulemaking hearing, set for January 2009, to revise the Site-specific uranium (U) surface-water standard to the statewide surface-water standard, which is the drinking water standard, and to eliminate the gross alpha and gross beta Site-specific standards. These changes were requested due to changed conditions resulting from cleanup and closure of the Site. WQCC also ruled in December 2007 that the current surface-water temporary modifications did not require change or elimination and that the current expiration date of December 31, 2009, remains in effect. DOE submitted information at

WQCC's October 2008 issues identification hearing for the triennial review of the South Platte River Basin surface-water standards, set for June 2009.

- Conditions that warranted further repair and that triggered further investigation were found at the Original Landfill (OLF) beginning in 2007. These conditions involved the localized slumping and settling of the OLF cover, seeps observed to daylight intermittently on the cover, and the development of a continuous seep at the eastern toe of the buttress (identified as Seep 8). Investigation fieldwork for the OLF Phase 2 geotechnical work began in December 2007 and was completed in April 2008. The Phase 2 work revealed that a clay layer containing organic materials at or near the bedrock contact appears to be a weak interface area. Modeling predicts small-scale instability due to percolating moisture that lubricates this weak interval. The OLF buttress is providing stability as intended, and there is no large-scale instability predicted; therefore, the observed conditions do not appear to indicate a need for urgent or major responses. Maintenance and repairs were made in 2008 after completion of the geotechnical investigation to address the observed conditions. The actions included adding soil to raise diversion berm heights to meet design criteria, constructing an extension to the Seep 7 drain, and adding fill to and regrading the west diversion channel to improve slope stability.
- Phase I upgrades to the Solar Ponds Plume Treatment System (SPPTS) were completed and implemented in October 2008. In an effort to improve water quality in North Walnut Creek, the upgrades were designed to capture and treat more contaminated groundwater that would otherwise discharge, without treatment, to the creek. A collection sump (the Interceptor Trench System Sump [ITSS]) was constructed adjacent to the former Interceptor Trench Pump House, and the east and west Interceptor Trench System manifolds were connected to the ITSS. Water that collects in the ITSS is pumped up the hill into the collection well installed within the groundwater intercept trench. The water is then pumped into the SPPTS treatment cells. Sampling of the SPPTS and North Walnut Creek locations was increased to support an evaluation of the effects of Phase I improvements to the system and to support planning for additional system upgrades to effectively treat the additional flow and higher concentrations of contaminants resulting from Phase I.
- Surface-water flow volumes show expected reductions resulting from land configuration changes and removal of impervious surfaces.
- All surface-water Points of Compliance showed acceptable water quality for the entire year.
- Point of Evaluation (POE) location GS10 continued to show reportable values for total U. Evaluation has suggested that these reportable values are due to changes in hydrologic conditions, which have caused groundwater with naturally occurring U to make up a larger proportion of streamflow at GS10. All other POEs and all other analytes at GS10 showed acceptable water quality for the entire year.
- Surface-water monitoring at the Present Landfill Treatment System showed four analytes as periodically above applicable standards. Additional monitoring was performed as required by the RFLMA data evaluation process. Results of the additional monitoring did not indicate water-quality levels requiring consultation between the RFLMA parties.
- The groundwater treatment systems at the Site continued to successfully remove contaminant loading to surface water from groundwater plumes.

- Groundwater quality and flow at the Site were generally consistent with previous years. Statistical trending calculations indicated numerous significant concentration trends. More trends were found to be decreasing than increasing (54 versus 44).
- The reportable condition reported at Area of Concern well B206989 in 2007 due to elevated concentrations of nitrate in groundwater samples persisted through 2008. Concentrations were consistent with previous data, but statistical trending incorporating 2008 data now indicates a decreasing trend in nitrate concentrations that is statistically significant at the 80 percent confidence level. Additional consultations will be held to confirm the path forward.
- The well that had monitored the hillside south of former Building 991, and which was abandoned in 2007 to support regrading of that slumping hillside, was replaced. The new well, 45608, is artesian. Analytical data are generally consistent with those from the original well, 45605, and with the former French drain outfall location, SW056.
- All RFLMA-required ecological data collection, analysis, and reporting were completed as scheduled.
- Revegetation monitoring data continues to document the establishment of the desirable grassland species at the Site.
- The annual data quality assessment showed that the Site continues to collect high-quality data sufficient for decision making.

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